to the left: *Desert where there are many griffins;* and on the right: *The Thirty Days' Desert* (possibly the Desert of Gobi). Farther north, near the line of the frozen region, is a turreted temple, with the legend: *This is the sepulchre of the Great Khan, and they do this: when he is borne to his burial, he comes accompanied by many armed men, who kill those whom they meet on the road, and they say that the souls of these persons are blessed because they go with the soul of the Great Khan to another life.*

North of Scandinavia Leardo puts *the people who do not see the sun for four months in the year;* and south of Ethiopia we find the empire of Prester John and these two inscriptions: *Here are four-footed animals with human faces;* and *Here are men with faces in their breasts.*

This most interesting map was acquired in April of this year by a member of the Council and presented to the American Geographical Society.

GEOGRAPHICAL RECORD.

AFRICA.

RUWENZORI PEAK REACHED.—Almost simultaneously with the arrival in Mombasa of the Duke of the Abruzzi and his party on their way to attempt the ascent of the Ruwenzori range, the *Geographical Journal* of the Royal Geographical Society (May, 1906) announces that Mr. Rudolf Grauer, an Austrian, with the Messrs. H. W. Tegart and H. E. Maddox, members of the Church Missionary Society in Uganda, have reached one of the peaks of the Range. On Jan. 18, their camp was just below the Mubuku glacier; and as they had to return to camp every night, three days elapsed before they were able to reach the peak, which they named King Edward's Rock, the top of which is about 15,070 feet above sea-level. They were much delayed throughout their work by fogs. In their opinion, the highest peak of the range is the one to which Sir Harry Johnston gave the name Duwoni. It is not far from King Edward's Rock, and they believe it is not over 16,500 feet high. They say that this culminating point of the range can be ascended if the porterage difficulty is overcome, so that provisions may be brought up and camp established at the base of the peak, where the climbers may wait for favourable conditions of weather.

COLLECTING EXPEDITION TO BRITISH EAST AFRICA.—The *Journal* of the American Museum of Natural History (April, 1906) says that Mr. Richard Tjader, a traveller and hunter of wide experience, accompanied by Mr. Herbert Lang, one of the Museum preparators, left New York on March 1 on an expedition into British East Africa (Uganda) for birds and mammals, particularly the large mammals of the region, for the Museum collections. The

party will land at Mombasa on the east coast and proceed thence by railroad to Nairobi. From Nairobi advance will be made by a circuitous route northward, westward, and southward to Port Florence on Lake Victoria, whence return to the coast will be made by boat and rail. The expedition has been provided for through the generosity of Mr. Samuel Thorne.

NAIROBI ON THE UGANDA RAILROAD.—Major Wangermée, Vice-Governor of the Congo Free State, describing his recent journey over the Uganda railroad, in the *Mouvement Géographique* (No. 16, 1906), says that Nairobi, the most important town on the line west of Mombasa and about half way between the Indian Ocean and Victoria Nyanza, stands at an elevation of 5,450 feet, the altitude assuring a comparatively temperate climate, which permits the cultivation of many varieties of European fruits, cereals, and vegetables. The European population is therefore increasing, and the white colonists, who have brought their families to Africa, have no desire to return to the mother country. As the train stops at the station, a considerable number of carriages and wagons are seen waiting for passengers or baggage. These conveyances are drawn by one, two, and even four horses. A number of English women come down to the station to await the distribution of the European mail. The town is planned on a large scale, and has a European quarter, where over 500 whites are living, and other distinct quarters for the Hindus and the negroes. Most of the houses and all of the railroad buildings are of galvanized iron, and even the chicken and dog houses are of the same material. An agricultural society is studying the best methods of cultivation and the kinds of useful plants and animals that will thrive best in that region, and is spreading this information among the colonists.

THE KHEDIVE VISITS THE OASIS OF SIVA.—The Khedive has just made an interesting journey to Siva, on the border between Tripoli and Egypt. He left Alexandria on Feb. 11 with four European companions and an Egyptian secretary, and reached the oasis nine days later. After having covered most of the way through the desert, about 325 kilometers, in seven days, camp was pitched five kilometers from the oasis, which was entered two days later. Five days were spent in visiting the fertile fields and gardens and talking with farmers and merchants as to the needs of the region and the best means of developing its resources. The oasis grows a large number of date-palms and olives, besides many fruit trees, some of which, like the apple, are scarce in Egypt. There are numerous brooks, but they are poorly utilized, and their waters are permitted to form unhealthful swamps. The Khedive returned to Alexandria on March 6.

EXPLORING EXPEDITION TO LIBERIA.—Dr. Walter Volz, Lecturer in Zoology in the University of Bern, will head an exploring party that is to be sent into the practically unknown hinterland of Liberia. This Great Forest region, which has been penetrated far east only by one or two explorers, will this time be approached from Sierra Leone. The funds have been supplied by the geographical societies of Switzerland, and the purposes in view are as much commercial and industrial as ethnographical and geographical. The scientific collections are to become the property of various Swiss museums.

SCIENTIFIC RESEARCH IN THE GERMAN AFRICAN COLONIES.—The *Zeitschrift* of the Berlin Geographical Society (No. 7, 1905) says that it is intended to place

the investigation of the geography of the German African colonies upon a systematic basis. A year ago a committee was appointed to inquire if more scientific results might not be obtained by the concentration of effort in one organization, instead of spreading the work of investigators among several channels, as has heretofore been the practice. The Committee has recommended that the detailed study of geography hereafter be carried out by stationing scientific observers at the Government posts by attaching them to expeditions and similar methods. The scope of their researches is defined as embracing "all departments of scientific knowledge that relate to the earth's surface and to its vegetable, animal, and human inhabitants."

DISTRIBUTION OF THE NEWTOWN PIPPIN.—The *Agricultural Journal* of the Cape of Good Hope (April, 1906) says that the Newtown pippin is recommended as a good variety to plant in South Africa, as it has been proved to thrive there. California is shipping Newtown pippins gathered in October and November to London, where they arrive in splendid condition, and may be kept in cold storage until the following March. The *Journal* says that this apple may be grown in South Africa in large quantities and shipped to England at a good profit.

About 200 years ago a seed from a roadside apple tree in the township of Newtown (Long Island), now a part of the City of New York, dropped into the edge of a swamp, and the tree that sprang from it was the original Newtown pippin. Grafts from this tree and its descendants have spread the fruit through parts of New York State, the middle Atlantic States, and along our Pacific coast, but the fruit does not yield its best results in the New England States. It has always been very popular in European markets as one of the best imported apples. The news that this famous apple is thriving in South Africa is an interesting illustration of the wide distribution of a commodity.

AMERICA.

TELEGRAPH LINES IN ALASKA.—It is announced from Washington that many changes in the telegraph lines in Alaska are in contemplation by the Signal Corps. The lines extending inland from Valdes to Eagle City and then down the Yukon to St. Michaels are very crooked, as it was thought best, owing to the roughness of the country, to stretch the pioneer wires along the streams. It is now the purpose to straighten these lines and shorten them wherever possible. The duplex system is to be introduced on the Alaskan cables, increasing their capacity about 75 per cent.—an important improvement, as the operators have difficulty now in handling all the business offered.

NEW BUILDING FOR THE GEOLOGICAL SURVEY.—A bill was introduced in both houses of Congress in March to appropriate the money required to erect a new building for the U. S. Geological Survey. The working force numbers nearly 2,000 persons, of whom half are employed only in summer. About 600 are engaged during the winter months in office work at Washington. The two buildings rented in that city for accommodation are so inadequate that even the corridors have to be utilized for desk space and map cases. Some employees are permitted to work at home for lack of proper office facilities, and others are housed in the National Museum and Smithsonian Institution. *Science* says (No. 594) that "Chemists, physicists, photographers, petrographers, draftsmen, engravers, lithographers, and other specialists must have room for their instru-

ments, working specimens, drawings, lithographic stones, presses, etc." The degree of crowding to which the office force is now subjected diminishes the quantity and depreciates the quality of the work.

The rented buildings, moreover, are not at all suitable for some purposes of the Bureau. About twenty-five rooms in the main building are so dark that work can be done only with the aid of artificial light. Forty-five persons are working all day in the largest of these rooms with the help of electric light. The delicate physical apparatus is constantly affected by the vibrations of the heavy printing-presses. The buildings are not of modern fire-proof construction, and Government property and records, estimated to be worth $6,000,000, are in constant danger of loss by fire. The Survey needs a strong, fire-proof, well-lighted building containing a net available space of at least 150,000 square feet, exclusive of basement and halls. Such a building would cost about $1,200,000, and the annual rent now paid on the buildings occupied is nearly three per cent. on that amount.

U. S. Waters that Reach Hudson Bay.—All the waters that reach Hudson Bay from the United States pass through Lake Winnipeg and thence into the bay through Nelson River. The two principal tributaries of Lake Winnipeg, and thus, indirectly, of Nelson River, are the Saskatchewan and the Red River. The Saskatchewan drains the major portions of the provinces of Alberta and Saskatchewan and the northwestern part of Assiniboia, in the Dominion of Canada, and, through St. Mary River, a small area in northwestern Montana in the United States. The Red River drains a large basin in the United States, covering portions of Minnesota and North and South Dakota. Both rivers are large and important.—(*Water Supply and Irrigation Paper,* No. 171.)

Hydrographic Work of the U. S. Geological Survey.—This work includes the collection of facts concerning the behaviour of water from the time it reaches the earth as rain or snow until it joins the oceans or great navigable rivers. These investigations became a distinct feature of the work of the Survey in the fall of 1888. The first specific appropriation for gauging streams was $12,500 in 1894. The appropriations have been gradually increased until, for the past four years, they have been $200,000 annually. The chief features of the work are the collection of data relating to the flow of surface waters and the study of the conditions affecting this flow. Studies are also made concerning river profiles, duration and magnitude of floods, water-power, etc. This work includes the study of the hydrography of every important river basin in the United States, and is of direct value in the commercial and agricultural development of the country. About 800 regular gauging stations were maintained in 1905, and the results of the work are published in a series of fourteen "Water Supply and Irrigation Papers" (Nos. 165 to 178).

Dr. Gilbert and the San Francisco Earthquake.—Dr. Gilbert, of the U. S. Geological Survey, was in the neighbourhood of San Francisco at the time of the recent earthquake. Instructions were at once sent to him from Washington to make as thorough a study as possible of the earthquake phenomena. He has been engaged for some time in making hydraulic experiments in the mining laboratory of the University of California at Berkeley.

Progress of the Reclamation Works.—Mr. F. H. Newell, Chief Engineer of

the U. S. Reclamation Service, has returned from an inspection of the works now under construction in Oklahoma, New Mexico, Arizona, California, Nevada, Utah, Colorado, and Kansas. The expenditures on the water storage and distribution systems are now aggregating about $1,000,000 a month, and in its magnitude the work is now among the first of public undertakings. Most of the large engineering problems have been worked out, and the activity on the more expensive undertaking is now at its height. The present rate of construction and expenditure is at its maximum, and will gradually decrease.

GEOLOGICAL WORK IN IOWA.—The Iowa Geological Survey, during the past year, has been investigating the peat deposits of the State, and has published the results in a preliminary report. A member of the staff has continued investigations of the coal deposits, both stratigraphical, areal, and in the matter of coal tests. This work will be published as a monograph when it is completed. Another phase of the work now in progress is a study of the quarry products of Iowa, including lime, cement materials, etc., with tests of them. This work, also, will be published separately.

KANSAS STATE GEOLOGICAL SURVEY.—The University Geological Survey was organized by the Board of Regents of the University of Kansas in 1894. In 1897 the State Legislature recognized this organization, and has regularly made appropriations for it at each session of the Legislature since that date. It has been provided that the Chancellor of the University should be *ex-officio* Director of the Survey, and the Professor of Geology of the University should have immediate charge of the Survey and should be State Geologist.

Volume VIII, containing the report on lead and zinc, is now being distributed. The appropriation bill for 1905 provided for the publication of a special report on oil and gas and also for an annual report on the mineral resources of the State.

The field work during 1905 was confined principally to investigations in connection with the report on oil and gas. Detailed stratigraphic work on the coal measures of the State was practically completed, and during the past winter maps of them have been prepared. Data were gathered last year and arranged for publication on the production of lead, zinc, coal, oil, gas, Portland and hydraulic cement, gypsum, salt, clay products, building-stone, and sand. Extensive investigations on roadbuilding material are now under way, and tests are being made on Kansas lime and sand for making sand-lime-brick.

CLIMATIC CENTRES AND CENTRES OF PLANT DISTRIBUTION.—In a recent number of the *American Naturalist* (Vol. XXXIX, No. 468, 1905, pp. 875-889), Edgar N. Transeau brings out the results of a study of the centres of plant distribution in relation to climatic conditions. Investigation has shown that forests, grass-lands, and deserts are arranged about certain climatic centres, the term "centre" not implying that the plants have necessarily spread from these regions, but that the most favourable climatic conditions for any special type of vegetation are here localized. In departing from these centres these conditions become more and more unfavourable. The author finds that if the ratios produced by dividing the amount of rainfall by the depth of evaporation for the same station be plotted on a map, they exhibit climatic centres corresponding in a general way with the centres of plant distribution. Moreover, the distribution of grassland, prairie, open forest, and dense forest regions is clearly indicated. This is believed to be explained by

the fact that such ratios involve four climatic factors of the greatest importance to plant life—viz., temperature, relative humidity, wind velocity, and rainfall. An interesting map of eastern North America shows the ratio of rainfall to evaporation, expressed in percentages.

The method suggested by Mr. Transeau is a novel one, and the relations which he has worked out are suggestive. Unfortunately, the whole matter of evaporation measurement is in a very uncertain and unsatisfactory state—a fact which the author clearly recognizes—and the relation between actual evaporation and possible evaporation has not been generally appreciated. Nevertheless, the conclusions reached in this paper are certainly interesting and important, and deserve attention. The Great Plains are marked by a rainfall equal to from 20% to 60% of the evaporation called for. The prairie region is indicated by a ratio from 60% to 80%. Here forests are confined to the low grounds. Between 80% and 100% is a region more or less coincident with "open forests," "groves," and "oak openings" on the uplands and dense forests on the low grounds. The deciduous forest centre in the southeast corresponds with the area of from 100% to 110% of ratio between rainfall and evaporation. The distribution of ratio above 110% in the coastal plain is similar to the position of the southeastern conifer centre. R. DEC. W.

FOREST PLANTING IN OKLAHOMA.—*Bulletin* No. 65, Forest Service, by G. L. Clothier, gives *Advice for Forest Planters in Oklahoma and adjacent Regions.* The Forest Service has for several years past been co-operating with farmers in making forest plantations in that district, and the information given in this *Bulletin* was collected by agents of the Service chiefly in connection with the making and execution of these plans. A large part of this region is practically without natural forests, and but a small part can grow trees without cultivation. The rainfall decreases from over 38 inches annually in the southeast to less than 12 inches in the northwest; but the soil is very fertile, and there is no doubt that, by means of a careful selection of species, the choice of suitable situations, and the proper management of the plantations, useful forest trees may be grown in every county of the region. Success in tree-planting on the plains, where rainfall is light and irregular and where evaporation is great, depends very largely upon proper tillage of the soil, careful directions for which are given. On the plains, also, a windbreak of forest trees must be provided on the south and west sides of the planting site, and is advisable, though not essential, on the north. The primary object of the windbreak is to shelter the orchard or a residence site, and to prevent hot winds from scorching the field crops. Valuable material may be furnished by the windbreak, but on the plains of eastern New Mexico and western Texas it must be a permanent feature of the farm, and must be maintained for its protective effects rather than for its product of wood. Several planting plans are described and illustrated; a good map of the region, showing rainfall and the silvical belts; and several half-tone illustrations of the results of planting accompany this Report. R. DEC. W.

FOREST BELTS AND CLIMATE IN KANSAS AND NEBRASKA.—*Bulletin* No. 66, Forest Service, by Royal S. Kellogg, deals with the *Forest Belts of Western Kansas and Nebraska,* embracing the territory in Kansas and Nebraska west of the ninety-ninth medidian, and in Colorado east of the one hundred and fourth meridian. The climate of nearly all this region is essentially semi-arid, with light rainfall, unevenly distributed, high winds, excessive evaporation, and great fluctuations

of temperature. These conditions become more marked from east to west, and are clearly reflected in the character of the forest growth and in the gradual disappearance of tree species. At Hays, Kans., the mean annual rainfall is 20.9 inches. At Wallace, due west of Hays, near the Colorado line, it is 16.1 inches. The average precipitation at Kearney, Neb., is 25.8 inches; at North Platte, 17.7 inches; at Gering, 14.8 inches. These places are on the Platte River, and clearly illustrate the increasing aridity towards the west.

The fluctuations in rainfall from year to year, and the irregular distribution through the year, are of more importance to forest growth than the mean annual amount. During thirty years at Dodge, Kans., the driest year gave 10.1 inches, and the wettest gave 33.7 inches. If the average rainfall at Dodge, 20 inches nearly, were constant and well distributed, it would suffice for the growth of many species of trees, but, as it is, the species actually found there are those which can endure a year with a rainfall of only 10 inches. This is likewise true throughout the plains region. Evaporation on the plains is much increased by the high winds, which cause at least four times the evaporation that would be found in a calm. The spring winds are especially high. The prevailing wind is northwesterly in winter and south to southwest in summer. The rainfall, as just noted, decreases from east to west; but evaporation increases, so that there is a rapid decrease westward in the amount of moisture available for plant life.

It results, naturally, from these conditions that the common hardwood trees are confined chiefly to the water-courses or comparatively wet locations. There is not sufficient subterranean water for all species, and the excessive evaporation limits plant distribution. The evaporation from leaves may be faster than the supply of water obtained through the roots, even when the latter are in very moist soil. In seasons of severe drought trees are killed. Climatic conditions, without question, are the limiting factors in the distribution of the tree species belonging to the valley type. Any factors which check wind movement and decrease evaporation render conditions of tree growth more favourable. Thus, cañon sides facing north, and hence less exposed to summer winds and the intensity of summer heat, are often covered with small trees and shrubs, while the opposite side of the same cañon contains hardly any woody growth. North and northeast slopes throughout this region are more favourable to tree growth of every kind than are other slopes or open levels.

The natural forest growth in Kansas and Nebraska is limited to the river courses and a few upland areas of pine and cedar. The valley type is the common forest type, composed mostly of broad-leaf species, and in the western part of both States confined closely to the water-courses. These broad-leaf species need more water than the conifers, and there is no good growth of them anywhere, except where the roots can reach nearly to permanent water. A good map of the forest distribution in western Kansas and Nebraska accompanies the Report. R. DEC. W.

THE COON BUTTE METEORITE.—A meteoric stone was found by Mr. D. M. Barringer in June, 1905, not far from Coon Butte, Ariz., which is described by Professor Mallet in the *American Journal of Science* for May. The aërolite was lying on the surface of the thin soil which covers the level limestone plain, the greater part of it being exposed to view, as it was imbedded in the soil only about an inch. Two broken corners were exposed to view, and the fractures exhibited seemed to be quite fresh. Mr. Barringer inferred that these corners were broken off at the time of the fall. No fragments were found; and it is believed

that the stone struck the earth at some distance from the place where it was found and bounded to this spot. Mr. Barringer thinks it highly probable that this aërolite was seen to fall by two different parties of observers about the middle of January, 1904.

MOUNT MCKINLEY.—Dr. F. A. Cook of Brooklyn will make another effort, this summer, to reach the top of Mount McKinley, the highest American mountain. He will be accompanied by Professor H. C. Parker of Columbia University, who has had much mountaineering experience. They have taken with them a number of assistants. Dr. Cook's first attempt to ascend the mountain was described by him in the BULLETIN (No. 6, 1904).

TIDES ON THE PACIFIC COAST OF CANADA.—A report by Mr. W. Bell Dawson, the engineer in charge of the Canadian Tidal Survey, on "Tide Levels and Datum Planes on the Pacific Coast of Canada" has been published by the Government (Supplement No. 1 to the 38th Ann. Rep. of the Dep. of Marine and Fisheries). It will be remembered that the tidal survey on the Atlantic side has been in progress for some years under Mr. Dawson's direction, and that the results have enabled the Marine Department to issue tide-tables for most of the principal ports. The levels which a continuous record of the tide affords are valuable not only for marine purposes but also for reference in the construction of wharfs, dredging, and other harbour improvements, and in city works.

The survey has now been extended to the Pacific Coast. The report says that the bench-marks and data used by the Admiralty and the Hudson Bay Company, in various towns on the coast, have been connected by levelling, and the bench-marks of Victoria, Esquimalt, Vancouver, and other tidal stations referred to one common standard. These levels are printed in the report.

While in the North Atlantic the tides are found to be chiefly influenced by the moon's phases, those of the Pacific have a pronounced diurnal inequality, which accords with the declination of the moon, and is also subject to an annual variation with the change in the declination of the sun. The solar influence is unusually large in the Pacific relatively to the lunar influence, and the annual variation is thus the more accentuated.

On some parts of the coast, during the greater part of the day, there is a long stand or only a slight fluctuation near high-water level, with a sharp, short drop to low water, which occurs once in the day. Owing to this diurnal inequality the two highest and lowest points in the tide-curve for the month may be as much as five days before or after the full and new moon. While the tides on the Atlantic side of Canada follow the phases of the moon, and accordingly the alternations of spring and neap tides are the dominant features, the tides on the Pacific side may be described as declination tides.

THE FIFTEENTH INTERNATIONAL CONGRESS OF AMERICANISTS, QUEBEC, 1906. The preliminary programme, issued in May, defines the subjects to be considered:

(*a*) The indigenous races of America, their origin, their geographical distribution, their history, their physical and intellectual characteristics, their languages, their civilization, mythology and religion, their manners and customs.

(*b*) The indigenous monuments and the archæology of America.

(*c*) The history of the discovery and the European occupation of the New World.

The languages of the Congress are French, English, German, Spanish and Italian.

Members are requested to forward to the Secrétaire Général, as soon as possible, the *titles* of their papers. The author of each communication registered in the programme must send in, before July 1, 1906, a summary to be printed in the daily Bulletin of the Congress.

Thirty-nine papers are already inscribed.

Details concerning receptions, excursions, etc., will be given in a subsequent programme.

The museums and libraries of Quebec will be free to the members of the Congress.

The membership fee is Three Dollars.

All correspondence is to be addressed to

DR. N. E. DIONNE,
Secrétaire général.

THE GEOLOGICAL SURVEY OF CANADA.—Some changes have recently been made in the organization of this Survey. For more than five years Dr. Robert Bell has been the Acting-Director, and has managed the business of the office as well as its scientific affairs. Mr. A. P. Low has now been appointed Director of the Survey and Dr. Bell has received the title of Chief Geologist of the Dominion. Dr. Bell will continue to prepare his reports, maps, and other work, but will be relieved of the large amount of routine involved in the management of the Survey. Since this began, sixty-three years ago, about 470 maps have been prepared and issued, and nearly one-third of this number has been published during the last five years.

DR. KOCH-GRÜNBERG IN THE UPPER RIO NEGRO REGION.—Dr. Koch-Grünberg recently returned from the region of the upper Rio Negro, a part of the northern Amazon basin that was very little known. Late last year he addressed the Berlin Geographical Society on his journey, and the account of his itineraries and his ethnological researches appears in the *Zeitschrift* of that Society (No. 2, 1906). The map which accompanies his paper is in part original material for the cartographers, as the explorer traced some of the unknown head waters of the Rio Negro. He made his headquarters at São Felippe, far up the Rio Negro, and found this town to be a well-ordered settlement in which a good measure of civilization has been introduced by a Spaniard who had settled there. In his journeys on the Içana, Uaupés, Aiary, Curicuriary, and other streams that swell the volume of the upper Rio Negro he observed, as a characteristic of the region, that the water systems approach quite near to one another. The Aiary, for example, in its upper course, approaches so close to the Uaupés as to permit the journey from one stream to the other to be made in three and a half hours across a low water parting. The Tiquié, a western tributary of the Uaupés, is separated from the system of the Yapurá by a low water-parting that was crossed in fifty minutes.

Dr. Koch-Grünberg made four journeys along these waterways, some of which rise in Colombia and others in Venezuela. On his second journey he descended the Rio Negro to the mouth of the Curicuriary, where he climbed a mountain of the same name which the natives associate with many legends. The path up the

mountain led through splendid virgin woods, and the ascent was difficult; but he was amply compensated by the view over the boundless forests. Comparatively few Indians live in this region, and they are emigrants from the Uaupés, chiefly Tukanos, who have here found a refuge from the advance of so-called civilization. He also found wandering Indians, the Maku, who live on a much lower plane of culture. Most of the rivers are broken by waterfalls. He collected much ethnological material among the various tribes, some of whom had never seen a white man. He says that black-and-white water streams alternate without apparent reason, the two kinds occurring sometimes only a few hundred yards apart, though flowing through the same forest and over the same soil. The natives regard the white water streams as conducive to fever, while they assert that the black water streams have no evil influence. The third journey, up the Uaupés, involved great labour, on account of many waterfalls; but above the junction with the Jurupary the river presents a wholly different character, and flows sluggishly through swamp lands entirely uninhabited.

THE FOSSILS FROM PATAGONIA.—Dr. William B. Scott, Professor of Geology at Princeton University, read a paper before the Wyoming (Pa.) Historical and Geological Society in which he described the remarkable discoveries of fossils in Patagonia. The paper is in the *Proceedings* for 1905. Some of the fossil bones taken to England by Captain Sullivan and Mr. Darwin were thought to be identical with certain European fossil remains, and it was one of the puzzles of geographical distribution how the same animals should be found in Europe and in the southern extremity of South America and yet be absent from North America. The hypotheses invented to account for this supposed paradox have been rendered superfluous by proof that the identification of the European genera was a mistake. The work of the Ameghino brothers revealed such an astonishing number of extraordinary animals that are found fossil in the rocks of Patagonia as to attract the attention of geologists and paleontologists. Dr. Scott then told of the three expeditions, 1896-99, led by Mr. J. B. Hatcher while connected with Princeton University, to acquire the necessary materials in Patagonia for a comparison between the strange fossils of that country and those of the northern hemisphere. His success was most gratifying, and his collections of fossils are of extraordinary richness and variety.

These fossils have been fully described and illustrated by Dr. A. E. Ortmann in Vol. 4 of the "Reports of the Princeton University Expeditions to Patagonia." Dr. Ortmann showed that the South American geologists had placed the Patagonian beds too low in the geological scale, and demonstrated that they are referable to the lower Miocene, and he further pointed out the close similarity between the fossils of the Patagonian beds and those of corresponding age in Australia and New Zealand. As the animals are of shore-water types which could not have crossed great depths or widths of sea this similarity is strong evidence for the former existence of a land connection between South America, Australia, and New Zealand, very likely by way of the Antarctic Continent. In connection with this statement by Dr. Scott it is interesting to mention the Tertiary fossils discovered in Graham Land by Dr. Nordenskjöld, which are identical with flora of the same geological age found in the southern part of South America.

The fossils of greatest interest secured were birds and mammals of the Santa Cruz beds which overlie the Patagonian beds, are several hundred feet in thickness, and cover a very large area of Patagonia from the mountains to the sea,

also extending eastward for an unknown distance under the waters of the Atlantic. A large part of the Santa Cruz collection was obtained where the water is from 20 to 30 feet deep at high tide. The tide here has a greater rise and fall than on any other open coast.

The Santa Cruz beds are chiefly volcanic materials apparently laid upon a land surface, their stratification being largely due to the sorting action of the wind. They contain an extraordinary abundance of fossil bones. which, as yet, have been found only in the more or less consolidated volcanic tuffs, which are very soft and easily eroded. This explains the occurrence of such a very unusual number of nearly or quite complete skeletons, even of the smallest or most fragile animals, that have been buried where they lay on the surface of the ground.

Dr. Scott thinks it is probable that many of the animals were caught alive, suffocated and buried in the showers of volcanic ashes and dust. To the observer who examines these fossils for the first time it is like getting into a new world where all the animals are different from the familiar types. Birds are surprisingly common in view of the usual scarcity of fossil birds. Most of the Santa Cruz birds were evidently incapable of flight, and some of them are of exceedingly large size. The most abundant and best-known genera, though flightless, are most nearly related to the South American cranes and not at all to the ostrich type. The mammals are far more important and abundant than the birds. Dr. Scott devoted most of his paper to descriptions of the rich and diversified life of Patagonia in Santa Cruz times.

ASIA.

A Notable Journey in Central Asia.—Count de Lesdain made a long journey through inner China and Tibet in 1904. He wrote from Darjeeling a brief letter to the Paris Geographical Society, on Nov. 25th last year, saying that he started on June 20th, 1904, from Peking, and first visited the still unknown desert region of Ordos, which is included between the Great Wall of China and the northern bend of the Hoang-Ho. Then he entered the region of Ala-Shan, to the west of Ordos, traversing it in various directions and discovering a large number of ruins. After making a journey to Kumbum, the explorer discovered several lakes in the still unknown part of the Central Gobi and then made preparation to cross Tibet. He first travelled through the salt waste of Tsaidam, and then made a very toilsome journey to the headwaters of the Yangtse-kiang, whence he travelled south, crossed the Brahmaputra, and finally reached Gyangtse, through which the British passed on their expedition to Lhasa. Further information from the Count is awaited with interest, as it is believed that he has procured material of much value for our knowledge of inner Asia.—(*La Géog.*, 1906, p. 170.)

Japanese Meteorological Service in Korea and Manchuria.—Professor Y. Wada, who at the beginning of the Russo-Japanese war was entrusted by the Japanese Government with the organization of a meteorological service in Korea and Manchuria, has prepared an account of this service, which appears in a recent number of the *Monthly Weather Review* (No. 9, 1905). The number of stations is now twelve, including Chemulpo, Mukden, and Port Arthur. There are, in addition, four others which are at the same time marine semaphore stations. The Chemulpo Observatory is of the first order. All the stations make six observations daily, at 2, 6, 10 A.M. and P.M., 135th meridian time (east of Greenwich). Each station is provided with a Fortin barometer, an August psychrometer, maxi-

mum and minimum thermometers, Robinson anemometer with electrical attachment, wind vane, rain gauge, atmometer, Jordan sunshine recorder, and Richard thermograph, barograph, and hygrograph. At the Chemulpo station there is also an anemograph, an anemo-cinemograph, a pluviograph, a micro-seismograph, earth thermometers, etc. Daily telegraphic reports are received from the principal stations in Japan and from those in Korea and Manchuria. Further, two daily telegrams are received from some Chinese stations and from Manila. These reports suffice to enable the Chemulpo Observatory to make weather predictions and to issue storm warnings. All meteorological stations on the Korean and Manchurian coasts issue weather predictions at 4 P.M. daily. The central observatory issues storm warnings when a cyclone is expected on or near the coasts of Korea and Manchuria. Storm signals are then displayed at all the stations.

R. DEC. W.

EARTHQUAKES IN FORMOSA.—Fully adequate reports have not yet been made on the very severe earthquakes in south Formosa which occurred on March 17 and April 14. In both shocks Kagi suffered more damage than any other town. The shock of March 17 killed 1,228 persons, and injured 2,329, while 5,556 houses were totally and 3,383 partially destroyed. The disturbance of April 14 was really more severe than the earlier one, but the death-roll was small, because the people were on the alert after their earlier experiences, and a comparatively small amount of damage was done, because there was not much left to destroy. In the second shock 7 persons were killed and 35 injured at Daigo, where 400 buildings were destroyed; while in the Ajensui district the casualties amounted to 3 killed and 15 injured, 1,191 houses collapsing and 749 being partially wrecked.

EUROPE.

POPULATION OF GERMANY.—The population of Germany, according to the enumeration of December 1, 1905, is 60,605,183. The States having the largest population are Prussia, 37,278,820; Bavaria, 6,512,824; Saxony, 4,502,350; Württemberg, 2,300,330; Baden, 2,009,320; Hesse, 1,210,104; and Mecklenburg-Schwerin, 624,881. Alsace-Lorraine has a population of 1,814,626. The most populous provinces in Prussia are Silesia, 4,935,823; Brandenburg, 3,529,839; Saxony, 2,978,679; Pomerania, 1,684,125; and Posen, 1,986,267. Berlin has 2,040,222 inhabitants.—(*Geog. Zeitsch.*, No. 4, 1906, p. 226.)

CHAIR OF GEOGRAPHY IN THE UNIVERSITY OF EDINBURGH.—The Senatus of the University of Edinburgh has approved of geography as a subject qualifying for graduation in the Faculties of Science and Arts, and the University authorities have given their approval to the proposal for the establishment of a Chair of Geography. The Councils of the Scottish Geographical Society, the Royal Society, and the Edinburgh Merchant Company have expressed themselves as favourable to this object, and a Committee representative of these and other bodies has been formed to raise the necessary funds for the endowment of the Chair. An appeal has been issued to the people of Scotland for their assistance in raising funds for this endowment. About $8,000 have thus far been subscribed. The minimum amount requisite to endow the Chair is $75,000, but if this sum is not immediately forthcoming, a lectureship may be established as a preliminary. In its appeal the Committee says:

The claims of the science of geography, as a university subject, have long been recognized by the leading German and French universities, and in recent years the universities of Oxford and Cambridge

have also established schools of geography. but as yet there is no special teaching of geography in any Scottish university. The efficient teaching of geography in our schools and colleges is one of the most urgent needs of our time, affecting the political and commercial welfare of the Empire, and it is believed that the subject cannot be satisfactorily dealt with until our universities take it up and provide, in the first place, adequate training for teachers.

THE HISTORY OF THE GEOGRAPHY OF SCOTLAND.—A recent address by Sir Archibald Geikie before the Scottish Geographical Society, published in the March number of the *Magazine,* outlines in an interesting style the main events in the geological history upon which the present scenery of Scotland depends. It is a scientific paper by the master who is best able to treat the subject, and a striking illustration of the relation of geographical features to geological changes, even to those of the most remote past.

A part of northwestern Scotland has the oldest-known landscape in Europe—a land surface so ancient "as to date back to a time before the earliest-recorded traces of living things had appeared upon the surface of the earth." This land surface was buried beneath a great thickness of strata, by the partial removal of which the fossil landscape has been brought to view, and after millions of years of preservation again become a land surface. After the burial of this ancient land beneath sedimentary deposits there came a period of great mountain growth, upheaving a lofty mountain range wider than the mainland of Scotland, and stretching for 1,600 miles from the west of Ireland, through Scotland and Scandinavia to the Arctic. In the course of this the rocks were not only folded, crumpled, and greatly altered, but broken along nearly horizontal planes or overthrust faults, and pushed bodily westward, bringing younger rocks above older ones. Some of these blocks "were thrust forward for a distance of ten miles or more."

Since this period of mountain-folding the rocks have been subjected to denudation and the mountains "cut down to their very roots." Again and again large areas have been down to sea-level, and even placed below the sea, receiving deposits of younger strata, remnants of some of which stand as outliers in favourable situation. Parts of the history are obscure, and some portions cannot be deciphered at all, for there are many gaps; but enough remains to permit the unravelling of the main threads of the history by which the landscape of to-day has been evolved. Not the least interesting of the events is the appearance of volcanic activity in the region, not once merely, but in several successive periods, the last and greatest being in Tertiary time.

Each of the events has stamped its mark on the present topography. The difference between Highlands and Lowlands; the peaks and valleys; the crags and terraced volcanic tablelands; the lochs and firths: in short, both the general and the detailed features of this interesting land can be understood only in the light of geology. Even the modern economic development of Scotland is dependent upon geological changes of the past. For example, the deposit of coal, which is of such vital importance to Scotland, was made possible by geological changes; but even more than that, had it not been

for the effect of subsequent dislocation of the crust, whereby the coal-fields were let down many hundreds of feet, and were then protected from denudation, these important elements (coal and iron) in our national resources might have been largely or wholly removed, as has happened in Ireland, where no such fortunate series of dislocations occurred to retard or prevent the destruction.

This history, well illustrated by maps and half-tones, is told in a most fascinating way, and well warrants Geikie's statement that

it impresses upon us how vague and incomplete our conceptions of landscape must be, unless we acquire

some knowledge of the origin and relations of the different topographical features which give to landscape its distinctive characters, its variety, and its charm.

It is encouraging to find such papers in geographical magazines, as witness that modern scientific geography is winning for itself a place in English-speaking countries. R. S. T.

ENCOURAGING FOREIGNERS TO VISIT SPAIN.—The Spanish Government has appointed a National Committee to have charge of the work of encouraging foreigners to visit that country. The Commission is preparing to distribute in foreign lands itineraries, following which the chief national monuments and art works, the finest scenery, etc., may be visited most easily and comfortably. It is also consulting with the railway companies with a view to establishing special tariffs and fast, comfortable trains. It is further designed to bring about the improvement of service of all kinds relating to travellers in every town where tourists are likely to stop.—(*Daily Consular Reports.*)

STUDYING THE LAGOON OF VENICE.—A systematic study of the phenomena relating to the lagoon of Venice has been undertaken by the Venetian Institute of Science, Letters and Arts. The work now under way is in charge of a special Commission. The first investigations, relating chiefly to the tidal waves in the upper Adriatic, together with the rivers flowing into it and the lagoon of Venice, are in charge of Dr. Giovanni Piero Magrini.

IMPOVERISHING THE PYRENEES.—French newspapers and scientific journals recently reiterated the statements that the high pastures among the Pyrenees were being destroyed by the excessive number of sheep kept on them, and that the inhabitants were continuing to deforest the mountains and to burn the underbrush over large areas. The result is said to be that the pastoral industry has been declining; and the diminution of the forests has caused faster melting of the snows and an increase of the destruction wrought by torrents in the lower valleys and among the foothills. The *Bulletin* of the Geographical Society of Languedoc (Quatrième Trimestre, 1905) says that the people of the lowlands complain that they are suffering from these practices of the mountaineers. The Bordeaux Association, whose special interest is the management of the mountain forests, undertook to restore the pasturage on 2,000 hectares in the valley of the Neste River. This work was very successful in the past year, and many mountaineers are profiting by the object-lesson given to them. Another mountain community has asked the Association's advice in efforts to improve the condition of its pastures; and still another, in the valley of the Adour, has stopped the practice of overgrazing. The mountaineers are becoming more and more inclined to substitute milch cows for sheep and goats. Count de Roquette strongly favours arboriculture as a means of improving the condition of the mountain-dwellers, and various means of reforestation by private enterprise and under Government control were considered at a recent meeting of the Bordeaux Association.

RUSSIAN POLITICS AND CLIMATE.—In an address on *The Geographical Foundations of Russian Politics,* by Dr. Charles Sarolea, delivered before the Royal Scottish Geographical Society, at Edinburgh, February 18 last, reference was made to certain climatic features which have been important controls in Russian national life. The unity of the infinite plain is rendered more striking because of the unity of the climate. In summer there is a unity of continental summer

heat. In winter there is a unity of snow, which buries the whole country from Poland to Siberia. The traveller can then go on his sledge for a distance of 6,000 miles from the Baltic to the Pacific; from Archangel to Astrakhan. In the extreme north are the frozen tundras, inhabited only by the Laplander and the reindeer. In the extreme south are the deserts of salt, crossed only by nomadic tribes and camels. In between European Russia is divided into three zones: the region of primeval forests in the north; the region of grassy steppes in the south; the intermediate region of arable land, the famous "black soil," fertile to a degree, yielding abundant harvests. The forest-dwellers have need of the agricultural products of the black soil, the granary of Russia. The farmers need the fuel and building material and moisture of the forest. The grassy steppe is the hinterland of the black soil. The arable land yearly encroaches on the steppe. Throughout these three zones Russia is an agricultural community.

The irresistible impulse towards summer climes has been natural and intense in the Russian people, "because no other nation has been so distinguished by nature, no nation has been so entirely bereft of heat and light." The Crimea and Transcaucasia, the southern provinces, have always been to Russia what Switzerland and the Riviera, Italy and Greece, are to an Englishman or a Teuton. This "heliotropic" instinct is like that which turns a flower toward light and heat.—(*Scottish Geogr. Mag.*, April, 1906.) R. DEC. W.

POLAR.

CAPTAIN MIKKELSEN'S EXPEDITION.—The Anglo-American Arctic Expedition, in command of Captain Ejnar Mikkelsen, has started for its field work. Captain Mikkelsen sailed from Victoria, B. C., on May 20 on board the schooner *Duchess of Bedford,* formerly a sealer, which he had purchased. The vessel is built of camphor wood without outside planking of kayacki wood, and is sheathed, above and below the water-line, with gum-wood, the bow being further protected with iron plates and two bulkheads and beams in the hold to withstand ice pressure. The schooner's length is 67½ feet, with 8-feet draught, and, with the additional strengthening which Captain Mikkelsen gave her, she is well adapted for Arctic work.

The scientific work which the expedition has in view includes tidal observations along Alaska and Banks Land, geological, ethnographical, and zoological collections among the western Parry Islands, meteorological observations during two years, a line of soundings northwest from Prince Patrick Island, and a sledge trip on the Arctic Ocean west from Banks Land for the purpose of locating the edge of the continental shelf and discovering new islands, if there is a western extension of the Parry archipelago.

Capt. Mikkelsen took with him in his ship the following persons: Mr. Leffingwell, geologist; Mr. E. Ditlevsen, naturalist and artist; Dr. George P. Howe, surgeon; and in the crew J. Edwards, mate; Mr. Parker, second mate; E. Gilmour, cook; Chr. Thursen and T. Storken, sailors.

Mr. V. Stefansson, ethnologist, started north from Athabasca Landing, May 12, to descend the Athabasca, Slave and Mackenzie Rivers to the Arctic Ocean, where he will meet the ship party. Mr. Stefansson expects to have an opportunity on the land journey to make desirable studies in his line of work. He will reach the Mackenzie delta about six weeks before the arrival of the vessel, and

will improve this time to make collections and studies for comparison with results to be obtained later among the Parry Islands.

Captain Mikkelsen on his journey north will make a short stop at Kadiak Island and then cruise along the coast of eastern Siberia, where he expects to purchase fifty or sixty dogs and one or two ponies. He hopes to enter Bering Strait about Aug. 1st, and push along the Alaskan coast in the shallow coast waters, thus avoiding the heavy pack-ice. Passing Point Barrow he will give what time may be spared to tidal observations, especially between Harrison Bay and Herschel Island, where there seems to be a sudden change of twelve hours in the tide constant. He hopes to reach the mouth of the Mackenzie about Aug. 20.

The united party of ten men will then sail eastward past Cape Bathurst, cross over to Prince of Wales Strait, and make a supply dépôt near Princess Royal Island. Retracing its course, it will establish winter quarters in Minto Inlet on the west coast of Prince Albert Land. Hunters will be sent out to secure fresh meat for the party and food for the dogs. As much scientific work as possible will be in progress during the winter.

In the spring of 1907 a party of two men, replenishing its supplies from the dépôt near Princess Royal Island, wil endeavour to cross over to Melville Island and thence to Prince Patrick Island. If this party succeeds it will be the first to pass through the interior of Prince Albert Land, Banks Land, and Melville and Prince Patrick Islands, four of the larger islands in the archipelago. The party will also try to survey the unexplored northwest coast of Prince Patrick Island, and hopes to make a sledge journey on the sea about 75 miles to the northwest, making soundings through the tidal cracks, and thus obtaining an idea of the configuration of the sea-bottom. It is hoped that this party will be back at head-quarters early in June, where the other scientific workers will have been engaged in extending their knowledge by trips from the vessel.

As soon as the ice has sufficiently opened, the vessel will cross over to Nelson Head at the south end of Banks Land, and thence sail up the west coast through the channel between the pack-ice and the shore to Burnet Bay, where she will unship the provisions and remain either until the autumn of 1907 or, if supplies permit, until the summer of 1908, being then sent home.

In the spring of 1908 a party of three men, the dogs, and the pony, with provisions for 140 days, will start over the sea-ice in a W. N. W. direction, making soundings as frequently as possible and keeping on the same course until the edge of the continental shelf is passed, land is found, or the position of 150° W. Long. and 76° 30′ N. Lat. is reached. If the edge of the continental shelf is reached, the party will endeavour to trace it to the westward. If land is found, it will be explored as far as the supplies permit. Provisions will be economized by killing draft animals when their services may be dispensed with; the weight drawn by each animal will be kept as even as possible. When it is necessary to return to the coast the party will retreat to Wrangel Island or to the nearest Alaskan coast, as circumstances may decide. The observers left at Burnet Bay will be taken home on the ship, but the sledge party will have to rely on the whalers along the Alaskan coast for passage home, unless they should arrive at Wrangel Island in time to meet their own vessel, which will call there on the way south.

Mr. Stefansson especially hopes that the field may be fruitful in ethnological collections, half of which have been pledged to Harvard and a quarter to Toronto

University for assistance rendered by these institutions to the expedition. He will study the old Eskimo remains in the western part of the Parry archipelago and the natives of to-day, if any are living there. He is a graduate student and an assistant Instructor in Anthropology in Harvard, and has twice held the Hemenway Fellowship in Anthropology. He spent the summer of 1904 and 1905 in Iceland, and brought home a large number of skulls and skeletons of the inhabitants of heathen times. These are now in the Peabody Museum.

Captain Mikkelsen's scheme of exploration covers a great deal of ground; but even if the conditions permit him to carry out only a part of his programme, the results will place his among the notable Arctic enterprises.

METEOROLOGICAL STATIONS IN THE ANTARCTIC.—The Argentine Government intends to maintain the scientific observation station started by the Scottish Antarctic Expedition on the South Orkneys, a little north of the Antarctic area, for at least another year, which will complete a series of observations extending over four years. At the end of December last the Argentine steamer *El Austral* left Buenos Aires with three scientific observers under the lead of Señor Lind to relieve the observers at Scotia Bay, South Orkneys. From that point the vessel was to go to Ushuaia, in Tierra del Fuego, where Mr. Angus Rankin, formerly in charge of the Ben Nevis Observatory, with three companions, had gone to await the steamer. With these observers on board, *El Austral* was to steam south to Wandel Island, in the Graham archipelago, where Rankin will establish a new meteorological and magnetic station in the Antarctic for the Argentine Government. Upon the return of the vessel to Buenos Aires, Mr. Mac Dougall, a former member of the Ben Nevis force, will be sent to South Georgia, where a second Antarctic station will be found. Thanks to the liberality of the Argentine Government, the meteorological and magnetic conditions of this part of the Antarctic will be fully investigated.—(*Geog. Zeitsch.*, No. 4, 1906.)

VARIOUS.

GREAT CANALS OF THE WORLD.—The U. S. Department of Commerce and Labor has issued a monograph on "Great Canals of the World" prepared in the Bureau of Statistics. It brings together a large amount of information on the great canals, with special reference to the Suez, Cronstadt and St. Petersburg, Corinth, Manchester, Kaiser Wilhelm, Elbe and Trave, Welland, Sault Sainte-Marie and Canadian canals. The interior canal systems of various countries are also adequately treated, and with much information as to their history, cost, freight rates, and the commerce that passes through them. This is a valuable compilation, relating to one of the greatest factors in international transportation.

FORESTS AND RIVERS.—At the meeting of the International Navigation Congress, held at Milan recently, the question of the influence of deforestation upon the régime and discharge of rivers was again discussed. There was no difference of opinion concerning the fact that improvident deforestation has markedly changed the water supply of neighbouring rivers; that brooks have disappeared; many rivers are less useful as sources of power; and that large rivers are more liable to flooding on the one hand and periods of low water on the other. Many striking examples were cited of the deleterious results of cutting down forests, especially in hilly districts. Thus, in the commune of La Bruguière, forests on

the slopes of the Montagne Noire (Tarn) were cut down. In consequence, a brook at the foot, whose water had been used for driving some mill-wheels, dried up in summer to such an extent that it was of no use as water power, while in winter floods caused great damage. After reforestation, the brook became more regular, and was once more available for power. The floods of winter also ceased. In Switzerland, in the canton of Berne, a spring which had ceased to flow started up again after reforestation of a mountain-side. Later, when the trees were again cut down, the spring almost disappeared. In the Kazan district of Russia, where formerly seventy water-mills were at work, and where most of the forests have been cut down, less than half of these mills are now running, and most of these on half-time only, being idle in summer for want of water. In winter the rivers are impetuous torrents, breaking up mill-dams and doing other damage. In Sicily, in the province of Messina, the river-beds have been raised by the stones and earth carried down by the torrents since deforestation, and great damage has been done by floods.—(*Nature,* Vol. 73, 1906, 319-320.) R. DEC. W.

VARIATIONS OF GLACIERS.—The tenth Report of the *Commission Internationale des Glaciers* shows that glaciers are still diminishing in those places where they have been studied. Not one of ninety glaciers in the Swiss Alps shows an advance, thus confirming the general results of the past seven years. In the Savoy Alps and in the Pyrenees the shrinkage continues. With few exceptions the Norwegian glaciers have retreated. During the past year more than 110 glaciers in the Pamir have been visited by M. Fedtchenko, and all appear to be diminishing. Similarly there is retreat, with few exceptions, in the northwestern United States and western Canada. In Africa the amount of snow in the crater of Kibo has not increased since 1901, according to Uhlig. Thus the retreat of the glaciers which began about forty-five years ago still continues. The slight rally occasionally noted during the past decade has been overpowered. R. DEC. W.

GLACIAL EROSION.—In a splendidly illustrated article (*Journ. Geol.,* Vol. XIV, 1906, pp. 22-54) E. C. Andrews describes the evidence of profound glacial erosion in New Zealand. U-shaped main valleys, with flat bottoms, truncated spurs, steepened lower slopes, and hanging tributary valleys, are both described and shown in excellent half-tones. These features and the fiords he ascribes to ice-erosion, as others have done for similar phenomena in the Alps, Norway, Rocky Mountains, Sierra Nevada, and Alaska; and few if any physiographers will consider that he has failed to establish his thesis.

Besides this description and interpretation, Andrews advances and discusses the theory that during stages of maximum glaciation or "ice-floods" the glaciers so deepen and broaden their valleys as to produce "too great breadth and too slight a grade to admit of further corrasion by the present insignificant representatives of the former glaciers." In this connection he considers the difference in behaviour of a river in flood and in quiet stage as a basis for understanding the difference in behaviour of flowing ice-sheets in their flood and shrunken stages. This is an important consideration, and Andrews makes a strong case of it. It supplies food for thought for those geologists who, witnessing the feeble ice-erosion of weak glaciers, at their ends—the points of greatest weakness—argue from these observations that consequently great glaciers several thousand feet deep and moving rapidly are protecting rather than eroding their beds. It is

somewhat like arguing that since a small brook in its shrunken summer stage is not eroding its bed, therefore the Colorado River could not have formed its cañon. Profound glacial erosion is now established; it remains to discover the processes and the nature and causes for variation in the work of this important agent in land sculpture, upon which so much of our grandest scenery depends.

R. S. T.

Professor R. S. Tarr of Cornell University will conduct an expedition to Alaska during the coming summer, with four assistants and a number of packers. This expedition will study the Malaspina and Bering Glaciers and make a reconnoissance survey of the bed rock geology of the region between Yakutat and Controller Bays.

U. S. BOARD ON GEOGRAPHIC NAMES.—DECISIONS May 2, 1906:

BLACK: mountain, Mohave county, Ariz. (Not Ute.)

BOOT: island, south of Ile Richard, Mackinac county, Mich. (Not Bootjack.)

CARBON: peak, Elk mountains, Gunnison county, Colo. (Not Castle Peak, Mount Carbon, nor Mount Ohio.)

CORYELL: island, east of Ile William, Mackinac county, Mich. (Not Ile Richard nor Coryell's.)

CUBE: point, northwestern part of Marquette island, Mackinac county, Mich. (Not Cube's, Cubes, nor Kechetotawnon.)

DEAD: mountains, San Bernardino county, Calif. (Not Black.)

DUCK: bay, eastern shore of Marquette island, northwest of Wisner point, Mackinac county, Mich. (Not Wisner's nor Muscallonge.)

ELK POINT: township and village, Union county, S. D. (Not Elkpoint.)

FOX: peak, on line between Granite and Ravalli counties, Mont.

GOVERNMENT: island, east of La Salle island, Mackinac county, Mich. (Not Ile William nor Ile Williams.)

GRAVELLY: island, east of Boot island, Mackinac county, Mich. (Not Ile Aux Cochons.)

HARNEY: peak, Black Hills, Pennington county, S. D. (Not Harney's.)

ISLAND No. 8: north of Ile William, Mackinac county, Mich. (Not Ile Isidore.)

MACKINAC: bay, east of Hessel, between south shore of Upper Peninsula and Marquette island, Mackinac county, Mich. (Not Duck nor Mackinaw.)

MARBLE: island, Sea Otter sound, southeastern Alaska. (Not Fox.)

MOHAVE: mountains, east of Colorado river, Mohave county, Ariz. (Not Chemehuevis nor Chimhuevis.)

MUSCALLONGE: bay, between Conners point and Wisners point, Mackinac county, Mich. (Not Big Muscallonge.)

ORCA: bay, Prince William sound, Alaska. (Not Cordova.)

PALISADES PARK: borough, Bergen county, N. J. (Not Palisade Park).

POQUOSON: river, emptying into Chesapeake bay, Va. (Not Pocoson, Pocosin, nor Poquosin.)

RACETRACK: peak, at the head of Boulder creek, latitude 46° 21′, longitude 113° 02′, Granite county, Mont. (Not Mount Powell.)

SAUK: point, near Baraboo, Sauk county, Wis. (Not point Sauk nor Sauk Summit.)

TSADAKA: creek, tributary to Matanuska river, 20 miles above Knik arm of Cook inlet, Alaska. (Not Moose.)

TUNP: mountain range above Rock creek, west of Hams Fork plateau, east of Sublets range, Uinta county, Wyo. (Not Campbell, Seedskeedee, nor Tetlick.)

WHITEFISH: point, west of Prentiss bay, Mackinac county, Mich. (Not Whist island nor Whitefish island.)

ARIZONA.

GRAND CANYON OF THE COLORADO, COCONINO COUNTY.

Ariel: point.
Boucher: trail.
Boulder: creek.
Brahma Temple: peak.
Bright Angel: canyon.
Bright Angel: creek, flowing into Colorado river.
Bright Angel: point.
Buddha Temple: peak.
Cameron: trail.
Cedar: spring.
Cheops Pyramid: butte.
Clear: creek, branch of Colorado river.
Coconino: plateau. (Not Colorado.)
Cocopa: point.
Confucius Temple: butte (one of Twin Buttes.)
Cope: butte.
Cremation: creek.
Crystal: creek, flowing into Colorado river. (Not West Fork.)
Dana: butte.
Deva Temple: peak.
Dragon: creek, flowing into Crystal creek. (Not East Fork.)
Dragon Head: butte.
Dripping: spring.
Garden: creek, flowing into Colorado river.
Grama: point.
Grand Canyon: canyon of the Colorado river.
Granite: gorge.
Grapevine: creek.
Greenland: spring.
Haunted: canyon.
Hermit: basin.
Hermit: creek.
Hindu Amphitheatre: basin. (Not Hindoo.)
Hopi: point. (Not Rowes.)
Horn: creek.
Horus Temple: peak.
Isis Temple: peak.
Komo: point.
Little Dragon: plateau.
Lyell: butte.
Manu Temple: butte.
Maricopa: point. (Not Sentinel.)
Marsh: butte.
Mencius Temple: butte (one of Twin Buttes).
Mohave: point.
Monument: creek.
Natchi: point.
Newton: butte.
Obi: point.
O'Neill: butte.
Osiris Temple: peak.
Outlet: canyon.
Outlet: spring.
Oza: butte.
Phantom: creek, flowing into Bright Angel creek. (Not West Fork.)
Pima: point.
Point Sublime.
Ribbon: falls.
Roaring: springs.
Salt: creek.
Shiva Temple: peak.
Shoshone: point. (Not Cremation.)
The Colonnade: high terrace.
The Dragon: plateau.
The Transept: deep canyon.
Tiyo: point.
Tonto: trail.
Tower of Ra: butte.
Tower of Set: butte.
Trinity: creek, flowing into Colorado river.
Tuna: creek.
Walhalla: plateau. (Not Greenland.)
Walla: valley.
Yaki: point.
Yavapai: point.
Yuma: point.
Zoroaster Temple: peak.
Ottoman Amphitheatre: basin.